UNIKC
Semiconductor

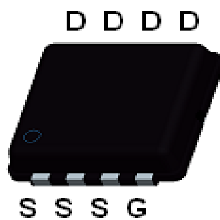
RoHS Compliant

# PE506BA

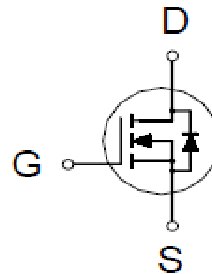
## N-Channel Enhancement Mode MOSFET

### PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 30V | 6mΩ @$V_{GS}$ = 10V | 38A |




PDFN 3X3P




### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[3] | $T_c$ = 25 °C | $I_D$ | 38 | A |
| | $T_c$ = 100 °C | | 24 | |
| | $T_A$ = 25 °C | | 12 | |
| | $T_A$= 70 °C | | 9.8 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 60 | |
| Avalanche Current | | $I_{AS}$ | 32 | |
| Avalanche Energy | L =0.1mH | $E_{AS}$ | 53 | mJ |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 15.6 | W |
| | $T_C$ = 100 °C | | 6.3 | |
| | $T_A$ = 25 °C | | 1.6 | |
| | $T_A$ = 70 °C | | 1 | |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | °C |

### THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Ambient[2] | $R_{\theta JA}$ | | 77 | °C / W |
| Junction-to-Case | $R_{\theta JC}$ | | 8 | |

[1]Pulse width limited by maximum junction temperature.

[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25° C.

[3]Package limitation current is 19A.

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### ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 30 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1 | 1.6 | 3 | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 24V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 20V, $V_{GS}$ = 0V, $T_J$ =125 °C | | | 10 | μA |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 4.5V, $I_D$ = 12A | | 6.2 | 9 | mΩ |
| | | $V_{GS}$ = 10V , $I_D$ = 12A | | 5.4 | 6 | mΩ |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 12A | | 80 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 15V, f = 1MHz | | 1818 | | pF |
| Output Capacitance | $C_{oss}$ | | | 263 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 218 | | pF |
| Total Gate Charge[2] | $Q_{g(VGS=10V)}$ | $V_{DS}$ = 15V , $I_D$ = 12A | | 43.8 | | nC |
| | $Q_{g(VGS=4.5V)}$ | | | 23.1 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 5.5 | | nC |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 12.7 | | nC |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DD}$= 15V, $I_D \cong$ 12A, $V_{GS}$ = 10V, $R_{GEN}$= 6Ω | | 25 | | nS |
| Rise Time[2] | $t_r$ | | | 24 | | nS |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 99 | | nS |
| Fall Time[2] | $t_f$ | | | 57 | | nS |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current[3] | $I_S$ | | | | 13 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 12A, $V_{GS}$ = 0V | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 12A, $dI_F/dt$ = 100A / μS, $V_{GS}$ = 0V | | 22 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 12 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

[3]Package limitation current is 19A.

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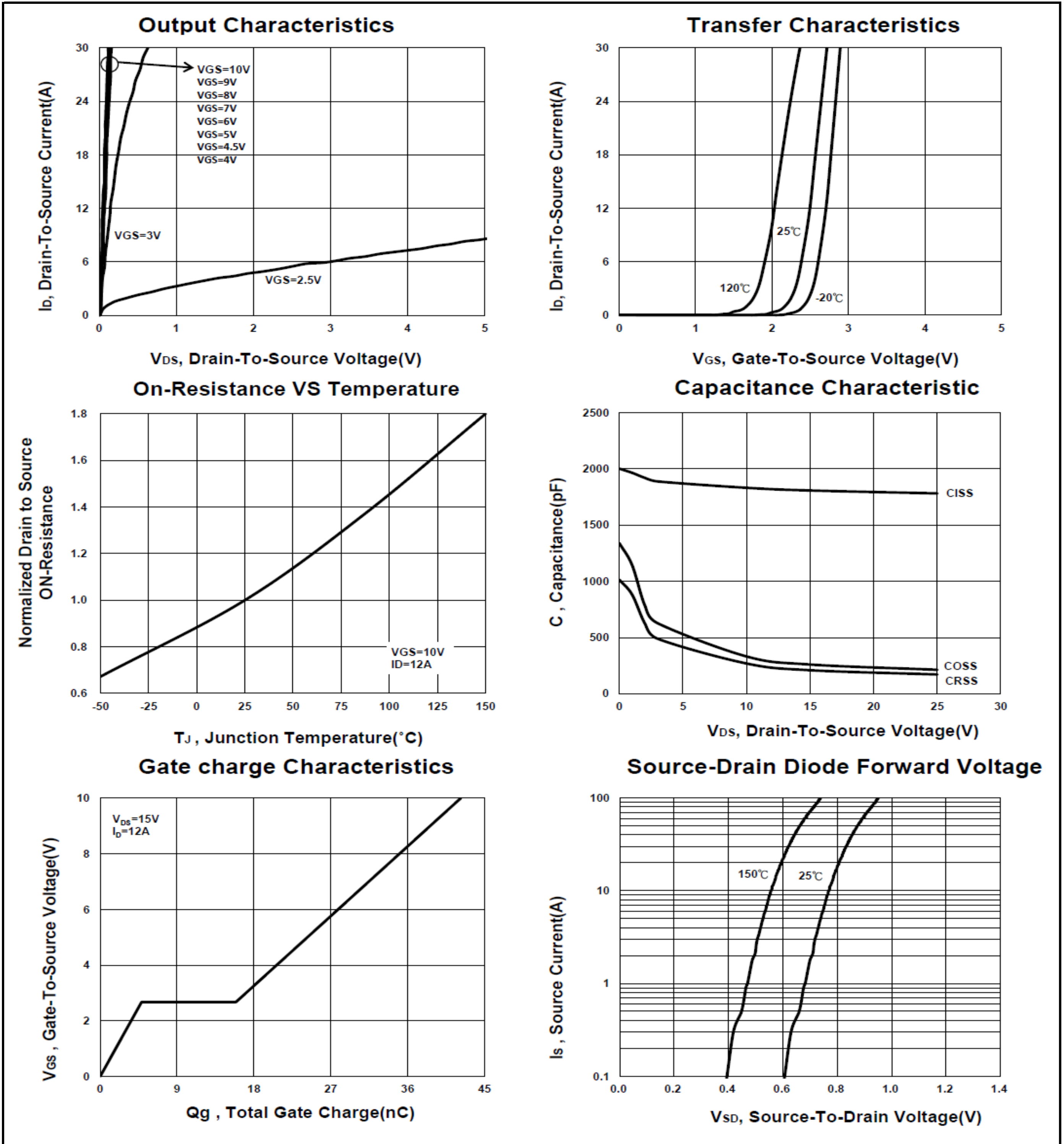

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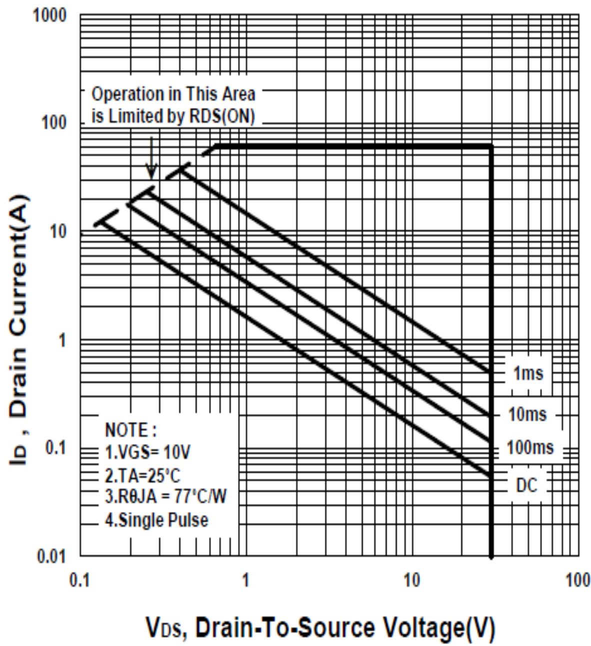


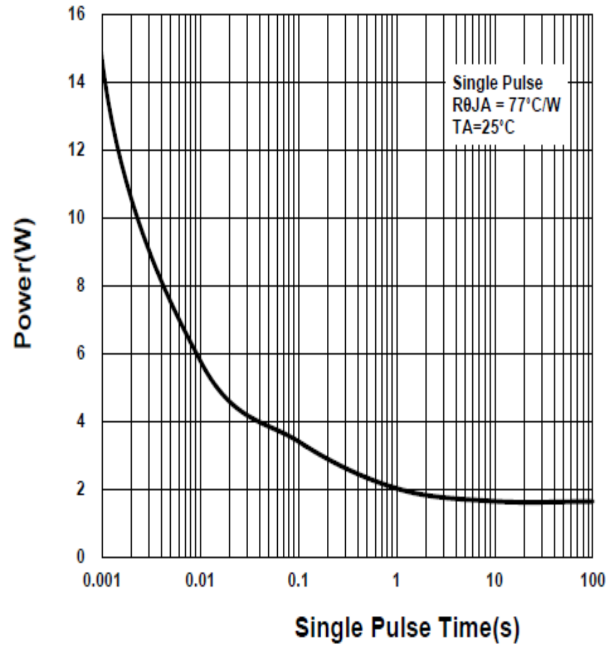


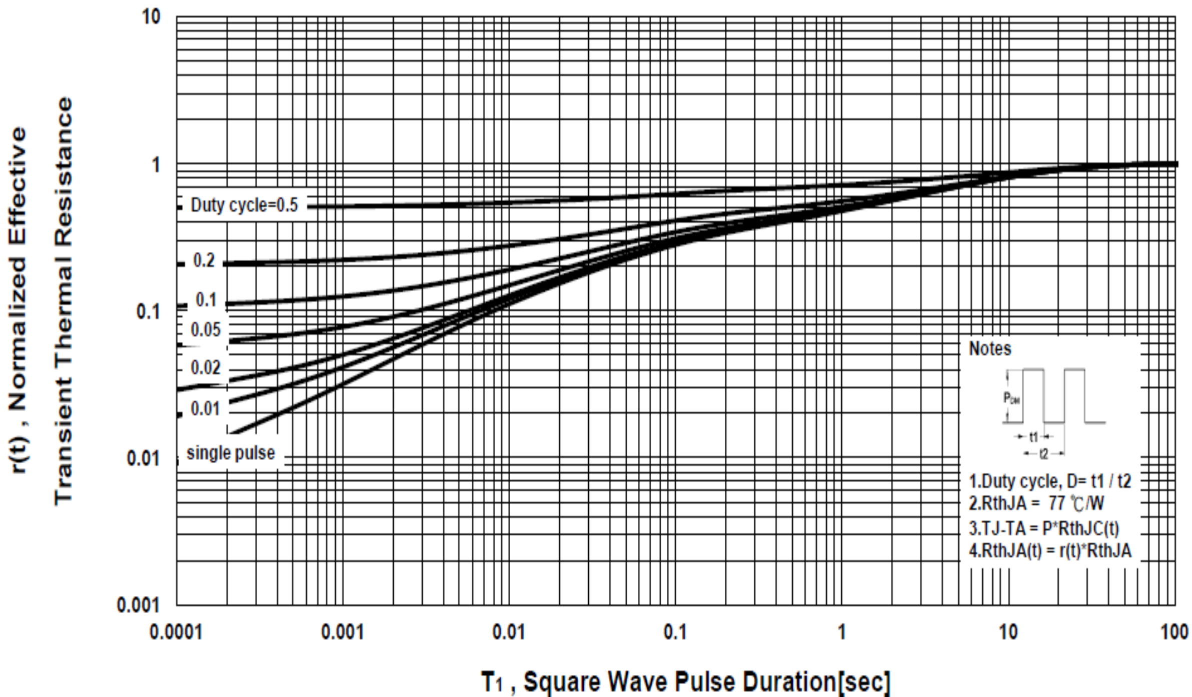

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## N-Channel Enhancement Mode MOSFET

### Package Dimension

## PDFN 3x3P MECHANICAL DATA

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 3 | | 3.6 | I | 0.7 | | 1.12 |
| B | 2.88 | | 3.2 | J | 0.1 | | 0.33 |
| C | 2.9 | | 3.2 | K | 0.6 | | |
| D | 1.98 | | 2.69 | L | 0° | 10° | 12° |
| E | 3 | | 3.6 | M | 0.14 | | 0.41 |
| F | 0 | | 0.455 | N | 0.6 | | 0.7 |
| G | 1.47 | | 2.2 | O | 0.12 | | 0.36 |
| H | 0.15 | | 0.56 | P | 0 | | 0.2 |